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M. E. McIVER, Editor

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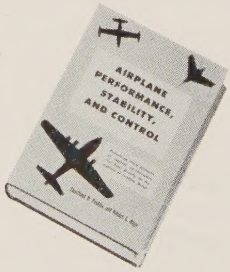

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The Spirit of Service

"The action of one in behalf of another performed in the interests of both is Service."

THE spirit of the American Association of Engineers is distinctly that of service; service to its members, and through them to the public. It is only through effective service that success and satisfaction come to us in our daily work.

A.A.E. was founded by young men, imbued with altruistic ideals, but practical enough to work for their own social and economic improvement, believing that with larger opportunities and better appreciation they could more effectively serve the health, comfort and prosperity of mankind. Whatever promotes the efficiency of the engineer redounds not so much to his own advantage as to that of his fellow men.

All through the years, we have continued to direct A.A.E. activities toward that end, and I believe that our accomplishments and our services indicate strongly that the Association has been true to its founders. However much we have accomplished there is still much more to do.

In order to achieve these ideals and to realize the vision of larger service, the Association must have members, more members, members who believe in and will support the ideals of this Society, now in its 36th year. It needs members who can devote time to association activities; others who cannot, because of professional duties, take an active part in society affairs, but who are "sold" on A.A.E.'s ideals and will support them by their continuous membership and by passing along to fellow engineers the good work that has been done and is now being done for the individual engineer.

Engineers of America have an opportunity in this great land to do for themselves what no other group of engineers can do in other lands. They are still "free agents," free to make of themselves what they will; free to make their profession serve them and the public; to give to the peoples of this great land even greater comforts and pleasures. But to fulfill its highest ideal the profession must be free from regimentation and control, and its members must be imbued with the spirit of service to all mankind.

In American Association of Engineers, members have an opportunity to speak for themselves, to work for their own improvement through national committees, or as officers and directors, or chapter affiliation. If there is no chapter in their towns, they are privileged to start one. And for services thus rendered, they will be repaid in personal benefits.

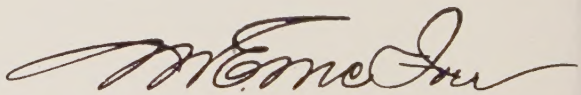
One of the largest gains secured by officers and members who

participate in chapter activities is the opportunity for self-improvement, for advancement which enhances public esteem. Success in engineering is not the result of technical proficiency alone, so much as it is the reflection of character, judgment, efficiency, and understanding of men. In the ordinary routine of daily work, many of these qualities are developed, but in systematic work in a national or chapter organization there are great opportunities for self-improvement, for fraternalism, for contacts. Many of our leading engineers have attained their distinction by faithful, broad-minded performance of work in their favorite engineering societies.

To be successful, one must broaden his sphere. "Nationalism" is now passe. We are "one world" conscious. No longer can an engineer who looks forward to a successful career isolate himself in a little world of slide-rules and theory. He must get out among 'em, know what is going on around him, get acquainted with non-technical phases of his profession, be able to express himself in public, take an interest in public affairs, keep his finger on the public's pulse (and recognize its tempo—) scientific, economic and political. This opportunity is offered to him in his engineering society. In this way, he serves his profession, the public and himself.

Truer words were never spoken than those of A.A.E.'s first president, W. D. Wilcox. Ponder them, make them your own, because they are as true of an individual as of a group:

"There must be as the basis of every organization that lives, an altruistic spirit. No organization that is founded on selfishness can endure permanently, but an organization that is founded on altruism, on the desire to do for others rather than a desire to get for oneself, has an element of life that will make it long endure."



Editor

Professional Status— Privilege or Penalty

"Professional status" is a matter of economics rather than prestige under the amended Fair Labor Standards Act.

Although a year has passed since amendments to the Fair Labor Standards Act and the Administrator's covering regulations and interpretations became effective, engineers are just becoming aware of the potentialities of these changes. An industry roars into high gear, the thousands of engineers brought under coverage of the Act by these changes are beginning to appreciate the benefits in overtime pay which will accrue as a result of their having been reclassified nonprofessional, nonexecutive, and nonadministrative employees.

Preoccupation with the Wagner Labor Relations Act caused professional engineers to overlook the very substantial safeguards of their economic rights embodied in the Fair Labor Standards Act during the years immediately following its enactment. Its provisions with regard to minimum pay were not significant, because practically all engineers received wages substantially higher than the minimum established by the Act in its first few years of operation. The importance of the statute's requirements in regard to overtime pay were not appreciated until defense production made overtime the rule, rather than the exception. Then engineers, jealous of the distinction implied in their classification as executive, administrative or professional employees, learned that professional status carried a penalty as well as a premium. Exempt from benefits of the Act as professional employees, they found themselves working at flat weekly or monthly salaries, without overtime allowance, for less total compensation than that paid to their nonprofessional co-workers and subordinates. When they weighed "professional status" against the advantages of overtime pay, a great many engineers began to wonder which was the birthright and which the mess of pottage.

Traditionally, an engineering degree had been recognized as an indication, at least, of "professionalism." In a practical and legal sense, a degree did not establish professional status. Engineering's own registration laws denied young graduates the privilege of using the designations "C.E.", "E.E.", and "M.E." until they became registered engineers. Engineering societies in their membership grades made practically the same distinction, withholding recognition of engineers' professional status untitl they had qualified for "responsible charge." Despite these denials of professional status, engineering violently opposed inclusion of "professional" employees in heterogeneous bargaining units delineated by the National Labor Rela-

tions Board, and crusaded for amendment of the Wagner Act to prohibit it. At the same time, the engineering profession urged "engineers-in-training" to defend their birthright of "professionalism" by abstaining from exercising any of the rights conferred by either the Fair Labor Standards Act or Wagner Act.

A degree in engineering satisfied but one of the requirements for professional status, set up by the Administarator of the F.L.S.A. in his first definition of the term. It was purely academic, and accordingly, most elastic:

A professional employee is one whose work is—

1. Predominantly intellectual and varied in character as opposed to routine mental or physical work, and

2. Requiring the constant exercise of discretion and judgment both as to the manner and time of performance as opposed to work subject to active direction and supervision, and

3. Of such character that the output produced or result accomplished cannot be standardized in relation to a given period of time, and

4. Based upon educational training in a specially organized body of knowledge as distinguished from either general academic education or from an apprenticeship or training in the performance of routine mental or physical processes in accordance with a previously indicated or standardized formula.

Draftsmen and other routineers contended that their work was not *predominantly* intellectual and varied in character; that it did not require the constant exercise of discretion and judgment, subject as it was to close supervision; and that the output could be, and usually was, standardized and measured on basis of quantity with relation to a given period of time. At the same time the draftsmen joined labor unions and quite clearly demonstrated that professional status was not, at least in their minds, a fetish. When designers and checkers, employed by the Lummus Company, a firm of industrial engineers, successfully contended that they had been improperly classified as professional workers and won $13,000 in back pay for overtime to which they would not have been entitled as "professional" workers, the full import of the law was apparent to engineers.

Administrative Difficulties

Beset by those who considered a "professional" classification discriminatory, and by those who regarded "professionalism" as a birthright, the Administrator of the F.L.S.A. in 1940, refined and elaborated his academic definititon of "professional employees" and added one quite finite test.* This was a sort of "rule of thumb" which decreed that no worker who earned less than $200 a month (exclusive of room, board and other incidental allowances) would thereafter be exempted from the Act as a "professional employee" or "administrative employee" and no one earning less than $30 a week could be classified as "executive." Only licensed doctors and lawyers were exempted from the ruling. Thenceforth, even regis-

*The validity of including a salary requirement in the regulations has been sustained in a number of appellate court decisions. See, for example, Walling v. Yeakley, 140 F.(2d) 830 (CCA 10).

tered engineers who earned less than $200 a month were automatically classified as "nonprofessional" and made eligible for overtime benefits.

Although they approved the new finite test in principle, labor unions contended that the dividing line has been drawn too low to protect their white collar members, and immediately began a campaign to raise it. Some unions urged that the figure be set at $400 a month, but others contended that workers receiving up to $600 a month should receive overtime benefits. The Wages and Hours Division began a series of hearings which continued through most of 1947 and into 1948, but no decision had been announced at the time the F.L.S.A. was amended in October, 1949. During those hearings all kinds of spokesmen for engineers dinned in the Administrator's ears widely divergent claims with regard to the most desirable method of drawing the new line of demarcation. The unions represented one pole, and certain organizations of registered engineers the other, the latter contending that engineers should be accorded the same treatment as doctors and lawyers, which meant classification of all registered engineers as professionals.

Meanwhile, the Taft-Hartley Act had limited discretion of the National Labor Relations Board by a rather intricate definition of "professional employee" which had the effect of requiring the Board to recognize the professional status of substantially all engineering graduates engaged in true engineering activities. Prior to the passage of the Taft-Hartley Act, many young engineers were afraid to insist that they were nonprofessional under the Fair Labor Standards Act (to secure overtime benefits) because the classification might prejudice their claims to professional status before the National Labor Relations Board and make them eligible for inclusion in heterogeneous bargaining units. Removed from the horns of this dilemma by the Taft-Hartley Act's recognition of their right to homogeneous bargaining units, young engineers lost their enthusiasm for the plan of exempting all registered engineers from the F.L.S.A., especially those whose base pay was little more than $200 a month.

New Regulations

Taking all this testimony into consideration, the Administrator of the F.L.S.A. revised definitions and interpretations of the terms "administrative", "executive", and "professional" as used in Section 13(a)(1) of the Act, and made the new regulations effective in January 1950, when the amendments to the original F.L.S.A. became operative. The new requirements for exemption under this section of the Act are stated in regulations, Part 541, issued by the Administrator (29 CFR pt. 541). An "explanatory bulletin" setting forth these definitions and interpretations and illustrating them is obtainable from the U.S. Government Printing Office, Washington, or from one of the regional offices of the Wages and Hours Bureau of the U. S. Department of Labor.

Under the new requirements, no employee is to be exempted as "professional" (registered doctors and lawyers excepted) unless he earns at least $75.00 a week (equivalent to $325 a month) exclusive of room, board or other facilities. In Puerto Rico and the Virgin Islands, $200 a month is still the line of demarcation. An employee who earns $75 a week is not, however, automatically classified as professional. He must still meet tests which pertain to his training and the actual character of work that he performs. In Sec. 541.99 of Regulations, the Administrator explicitly warns:

> The exempt or nonexempt status of any particular employee must be determined on the basis of whether his duties, responsibilities, and salary meet all the requirements of the pertinent section of the regulations. The employee's title or class specification is of no significance in determining whether he meets these tests. The use of any job titles in the illustrations contained in this bulletin should not be construed to mean that employees holding such titles are either exempt or nonexempt, or that they meet any one of the specific requirements for exemption. In any specific case it is the actual work performance, the responsibilities, and salary of the individual employee which determines whether a particular test has been met or whether the exemption applies . . . . .
>
> . . . . . It should be borne in mind that a change in the employee's assignment may bring with it a change in his exemption status. For example, an employee may be assigned additional or different duties during a busy period. Such additional or different duties should be considered in ascertaining whether the employee meets the requirements for exemption during those weeks.
>
> Finally it is a well-established principle that the burden of proving exemption under Sec. 13(a)(1), as well as any other exemption provision of the Fair Labor Standards Act, rests on the employer.

Unmistakably, the regulations make the *work* done by an employee the test of his professional status. Insofar as they describe the character of *work* which indicates professional status the definition of professional employees in the Taft-Hartley Act and that in the Regulations issued by the Administrator of the Fair Labor Standards Act are identical. There is a striking difference, however. The Taft-Hartley Act, with the intention of screening out of heterogeneous unions all those engineering graduates whom the profession itself dubs "engineers-in-training", "engineering cadets", or "sub-professionals", includes this supplementary clause:

> Any employee who (i) has completed the courses of specialized intellectual instruction and study described in clause (iv) of paragraph (a) and (ii) is performing related work under the supervision of a professional person to qualify himself to become a professional employee as defined in paragraph (a).

This clause is not found in the Administrator's definition. He supplements the purely academic definition of "professional work" with his own finite test of professional status. His test is intended to screen out of the exempt group those whose work is professional in character but whose salaries are so low that they deserve protection afforded by the Act's provisions in regard to overtime pay. This test, of course, is the requirement that all employees earning less than $75 a week must be classified as non-professional regardless of the character of their work and responsibilities. It does not follow that all employees earning $75 a week or more are automatically classified professional and thereby exempted.

One new provision, however, does almost automatically accord professional recognition to those engaged in work of a professional character who earn as much as $100 a week. That proviso, found in Section 541.3 says:

The definition of "professional" contains a special proviso for employees who are compensated on a salary or fee basis (exclusive of board, lodging or other facilities) as a rate of at least $100 per week. . . . The exemption will apply to highly paid employees employed either in one of the learned professions or in an artistic profession and doing primarily professional work. If an employee qualifies for exemption under this proviso, it is not necessary to test his qualifications in detail under paragraphs (a) through (e).

Executive and Administrative Employees

Some engineers, employed in an "executive" capacity have been exempt and therefore deprived of overtime benefits because while the old regulations were in force they received a salary of $30 a week or more. These are the new standards established by the Administrator for determining executive status: (Regulations, Sec. 541.100)

The term "employee, employed in a bona fide executive . . . capacity" in Section 13(a)(1) of the act shall mean any employee—
(a) whose primary duty consists of the management of the enterprise in which he is employed or of a customarily recognized department or subdivision thereof; and
(b) who customarily and regularly directs the work of two or more other employees therein; and
(c) who has the authority to hire or fire other employees or whose suggestions and recommendations as to the hiring or firing and as to the advancement and promotion or any other change of status of other employees will be given particular weight; and
(d) who customarily and regularly exercises discretionary powers; and
(e) who does not devote more than 20 per cent of his hours worked in the work-week to activities which are not directly and closely related to the performance of the work described in paragraphs (a) through (d) of this section: Provided, that this paragraph (e) shall not apply in the case of an employee who is in sole charge of an independent establishment or a physically separated branch establishment, or who owns at least a 20 per cent interest in the enterprise in which he is employed; and
(f) who is compensated for his services on a salary basis at a rate of not less than $55 per week (or $30 per week if employed in Puerto Rico or the Virgin Islands) exclusive of board, lodging, or other facilities . . . . .

Administrative status also exempts employees from the Act and frees the employer from any legal obligation to meet overtime requirements of the Act. Section 541.2 of the Regulations defines the term "bona fide . . . . administrative" as follows:

The term "employee employed in a bona fide administrative . . . . " capacity in Section 13(a)(1) of the Act shall mean any employee—
(a) whose primary duty consists of the performance of office or non-manual field work directly related to management policies or general business operations of his employer or his employer's customers; and
(b) who customarily and regularly exercises discretion and independent judgment; and
(c) (1) who regularly and directly assists a proprietor, or an employee employed in a bona fide executive or administrative capacity (as such terms are defined in these regulations), or

(2) who performs under only general supervision work along specialized or technical lines requiring special training, experience, or knowledge, or

(3) who executes under only general supervision special assignments and tasks; and
(d) who does not devote more than 20 per cent of his hours worked in the workweek

to activities which are not directly and closely related to the performance of the work described in paragraphs (a) through (c) of this section; and
(e) who is compensated for his services on a salary or fee basis at a rate of not less than $75 per week (or $200 a month if employed in Puerto Rico or the Virgin Islands) exclusive of board, lodging, or other facilities; . . . . .

In the sections relating to executive and administrative employees there is found the same provisions with regard to "highly paid employees" (those earning $100 a week or more) that was incorporated in the new requirements regarding professional employees.

Effects of New Regulations

These new regulations extend overtime benefits to great numbers of professional, executive and administrative engineers, but the full effect will not be felt until industry is going full blast and these employees are rewarded for their part in the great effort by large sums in overtime pay. Expecting immediate and very substantial increases in compensation, many engineers reclassified as nonprofessional have been disappointed in the direct effects of the new regulations.

Many engineers naively expected employers to increase their salaries at once from the former rate of $200 a month, required for exemption of professionals, to the new level established by the Administrator, $75 a week (or $325 a month). Nothing in the Act or in the Administrator's regulations requires such action. In many cases such drastic raises (62.5%) would put an unbearable strain on the enterprise, working a hardship on the employer, but also threatening the "job security" of the employee. The only change required is that the employer recognize his employee's nonprofessional status if he maintains the old rate of pay, and pay the overtime compensation required by the law for hours in excess of 40 per week.

Some engineers have been chagrined to learn that reclassification as nonprofessional does not necessarily mean a big and immediate increase in pay through overtime payments based on the same schedule of hours worked that prevailed when the employee was regarded as professional, and thereby exempt.

Let us consider a purely hypothetical case in which the fallacy of this assumption is apparent. Please let it be understood that the illustration is purely hypothetical, although situations of this kind have been brought to the attention of the Administrator and he has approved the course of action taken by employers in such cases as being quite consistent with the requirements of the Act and the regulations.

Engineer "A" has been employed for five years in a rather small enterprise which promised good opportunities for his development into an executive at a very substantial salary. The plant regularly operated on a 45 hour workweek schedule. Engineer "A" with a salary of $200 a month worked as long as the other employees, but received no overtime pay even when he worked more than 45 hours in some weeks, because he was classified "professional" and exempt. Engineer "A" therefore assumed that his

monthly paycheck of $200 (which was equivalent to $2400 a year, $46.15 approximately—a week) included no compensation for overtime. It represented, in accordance with this assumption, an hourly wage of almost exactly $1.15 (46.15 divided by 40). When he talked things over with his employer, these are the figures he presented to show why he should, as a nonprofessional employee, entitled to overtime pay, receive an increase of almost $10 a week:

Regular rate—$1.15 an hour	
40 hours straight time at $1.15 an hour approx.	$46.00
5 hours overtime meant (1½x5x$1.15)	8.62
Weekly rate for 45 hour week	54.62

The employer said frankly that he could not give Engineer "A" what amounted to a $10 a week raise. He contended that the old rate of $46.15 a week covered 40 hours straight time and 5 hours overtime. In other words, the $46.15 included pay at approximately 97c an hour for 47½ hours (40 plus 1½x5 hours). He offered to raise the hourly rate from 97c to $1.00 an hour for convenience in bookkeeping, which would work out as follows:

40 hours straight time at $1.00 an hour	$40 per week
(1½x5) or 7½ hours overtime allowance at $1.00	$7.50
Weekly rate, including straight and overtime	$47.50

It was, of course, understood that the engineer would receive additional overtime for hours worked in excess of 45 per week. Thus the employer contended he could meet all the requirements of the Fair Labor Standards Act and its covering regulations.

In another plant, and this is also a hypothetical case, the regular workweek was 40 hours, but almost invariably it was necessary for Engineer "B" to put in several hours overtime during the fourth week of the month. Receiving $200 a month, Engineer "B" was "professional" under the old regulations and the employer was not required to pay him overtime compensation—or even straight time for these extra hours. Engineer "B" confidently expected to earn about $10 a month in this periodic overtime work. The plant operated with a bi-weekly pay period. During the third week, the one preceding that in which Engineer "B" knew he would be given overtime assignments, Engineer "B" was instructed to take "time off" amounting to 7½ hours; this would compensate for the 5 hours overtime he was expected to put in during the following rush week. Engineer "B", therefore, got no more money in that pay period than he had previously received. He got instead leisure time equivalent to 1½x5 hours, offsetting the 5 hours overtime he eventually worked. Because the offtime and overtime occurred in the same pay period, he learned, the employer had met all the requirements of the Fair Labor Standards Act by offsetting overtime with timeoff.

In both cases, the employees discovered that the Fair Labor Standards

Act is not a general panacea for low wages. It was necessary for the employer and his employee to reach a valid agreement or contract without aid from the Wages and Hours Bureau. Individual contracts of this kind, of course, are possible only when the employee is not a member of a recognized bargaining unit. The Wagner and Taft-Hartley Acts would require that a bargaining representative be present and concur if the employer makes an individual agreement with a member of a recognized bargaining unit.

Employers, too, have found some rather disconcerting liabilities in the new law which did not exist under the original statute and its covering regulations. They have found, for example, the changes in the work assignment of exempt employees, even temporary changes, may change their exempt status. They have learned that deductions from paychecks of employees for absence (after they have exhausted vacation and sick leave allowances) particularly if made from paychecks covering weeks in which employees have been on duty even part of the period, may have the same effect.

Another new feature of the Fair Labor Standards Act which may have quite interesting repercussions is the rather detailed definition of "regular rates of pay" found in Section 7(d). The "regular rates of pay" are to include all remuneration for employment paid to, or on behalf of the worker with certain specified exceptions. Engineers, both employers and employees, are advised to study this new feature of the Act and the regulations which interpret it. Pension and profit sharing plans, unless expertly drawn with full understanding of the Administrator's interpretations of the term "regular rate" and the specified exceptions, will possibly exert a significant influence on overtime rates and the plans themselves could prove much more costly than the framers of the plans originally intended or expected.

At least, the amendment of the Wagner Act and of the Fair Labor Standards Act, as those amendments have been interpreted by administrators of the two measures, has freed the engineering profession of one bugaboo. No longer need the guardians of "professional status" worry about the interoperation of the two acts. Each law has its own little gimmick now for testing professional status, and incongruous as it may seem an engineer may be fully professional under the Taft-Hartley (or amended Wagner) Act., and still be clearly nonprofessional and entitled to overtime under the Fair Labor Standards Act. This is no more ironic than the condition which exists within the profession—a condition in which many factions differ as profoundly as do the administrators of these two acts in regard to the question "Who is professional?"

The Bridgebuilders

by D. B. Steinman

A master builder had three ambitious apprentices. Devotedly he labored to impart to them his skill, his art, and his inspiration. As a final test, the master assigned each youth to build a bridge.

The first apprentice proceeded at breathless speed and proudly finished ahead of the others. But soon his hopes of praise were dashed: His bridge was lacking in strength and it quickly crashed under load. Fearing to face the master, he fled in shame.

The bridge built by the second apprentice had strength, but was woefully lacking in beauty. The lines were crude; the form was awkward, angular, and clumsy. The span was a blight on the landscape. Blind to these faults, the young builder proudly boasted: "This bridge will stand for many years." But the master replied: "That is the tragedy. You have made your bridge a lasting eyesore. People have to live with the bridges we build. When you build a structure that is ugly, you are faithless to both God and man. God made the world beautiful, and He has given us the trust to continue the work of creation. No man is worthy of being a builder unless he is inspired with a passion to make his structures beautiful."

The third disciple wrought his dream into a bridge that was a symphony, a harmonious union of beauty and strength. The best in his heart and his mind—all of his dreams and aspirations—all of his passion for beauty—went into the building of this span.

And to him the master said: "You have used the talents and the inspiration that God has given you. You have nobly planned and nobly wrought, and you have created beauty. Your work is a delight to the eye and a lift to the heart. Today and in the years to come, countless men will bless you—for you have not only built a great span to serve them but you have also lifted their spirits and enriched their lives with a vision of the beautiful."

Long Beach Junior

The chapter at Long Beach City College started the year in good form under the active leadership of the following officers: President, Earl L. Watson; vice president, Bill Hoover; recording secretary, Carl F. Hammer; treasurer, Glenn T. Read, Jr., and corresponding secretary, Richard A. Kirk. Sponsor of the group is Noble Hines.

Phoenix College

Under the leadership of Amos H. Hoff, Head of Engineering at the College, the boys are having a most active and successful year, in spite of the unusual military demands upon the students.

Riverside College

"We have a fine club this year, good quality students and some good leadership," writes A. J. Twogood, sponsor of our Riverside College Engineering Club. "We have had some fine meetings at the college," continues Mr. Twogood, "and others in co-operation with the San Bernardino Chapter, which is actively taking us under its wing. The scholarship which they are offering for the best freshman engineer for the year in each of Riverside, Chaffey, and San Bernardino is a fine thing."

Good work, San Bernardino!

Arkansas State College

Ronald Alexander, Secretary of the A.A.E. Student Chapter at Arkansas State, assumed his secretarial duties in exactly the right way—by sending a check for the group's dues; enclosing a list of student members, giving us the list of chapter officers, and explaining briefly the chapter plans for the year. Good work, Mr. Alexander. The Engineering department is headed by Henri Rigo, a graduate of Ohio University.

Book Reviews

Electrical Engineers' Handbook, 4th ed. Harold Pender, Ph.D., Sc.D., and Knox McIlwain, B.S., E.E., editors. John Wiley and Sons. $8.50.

The new fourth edition of this "book of books" is exceedingly well done, as are all the books in the Wiley Engineering Handbook series. Because of the growth of knowledge and the greater degree of specialization in the various phases of electrical engineering, it has been necessary to add considerable new and valuable material. Highly recommended.

Modern Air-Conditioning, Heating and Ventilating, 2nd ed. William H. Carrier, R. E. Cherne and Walter A. Grant. Pitman Pub. Co. $10.00.

Prepared to serve as both an applications handbook and instruction manual. Material never before presented in this type of book has been covered. New tables have been added as well as new techniques in air cleaning and purification. A practical manual covering the entire field.

Refrigeration Engineering, 2nd ed. H. J. Macintire and F. W. Hutchinson. John Wiley and Sons. $6.50.

A successor to Professor Macintire's Handbook of Mechanical Refrigeration, revised and expanded to cover the entire field. The heat pump and panel cooling systems are well presented. A book that is a credit to the authors.

Combustion Engineering. 5th ed. $7.50. Combustion Engineering-Superheater, Inc.

This up-to-date book deals with various methods and equipment used for fuel burning, steam generation, and heat recovery. Brief outlines of early developments, as contrasted with modern designs are included. Outstanding fuel technologists, specialists and combustion engineers have prepared the material in an interesting and comprehensive manner.

Handbook of Chemistry and Physics 32nd ed. Charles D. Hodgman, M.S. Associate Professor Physics, Case Inst. of Tech., editor in chief. Chemical Rubber Pub. Co. $7.50.

While the new edition has been revised and the material brought right up to date, the general features and scheme of arrangement have been retained. The author has tried to cover all branches of chemistry and physics. Many new tables have been added including scientific and engineering abbreviations and symbols.

Report Preparation, 2nd ed. Frank Kerekes and Robley Winfrey, Iowa State College Press. $6.90.

An exceedingly valuable book that should be the property of every engineer whose goal is success. Planning and writing the report, format, arrangement, presentation of charts and tables, written and oral presentation, editing are some of the subjects discussed. One of the best treatises on the subject this reviewer has seen. Highly recommended.

Ingenious Mechanisms for Designers and Inventors, 1st ed. Vol. III, by H. L. Horton. Industrial Press. Three volumes $15. Two volumes, $10 and one volume $6.

The third volume contains mechanisms and mechanical movements not described in Vol. I and II. Although an independent treatise, the same general classification and chapter headings used in the first two volumes have been retained. Well illustrated. The three volumes makes a comprehensive encyclopedia of mechanical movements.

Die Design and Diemaking Practice, 3rd ed. Edited by Franklin D. Jones. Industrial Press. $7.00.

Here's a book for die designers and diemakers replete with illustrated descriptions of dies for all kinds of power press operations, and containing much practical information and data o

pproved designing practice and die construction. 1014 pp. A valuable book.

Plant Engineering Handbook. William Staniar, editor-in-chief. 1st. ed. McGraw-Hill Book Co. $15.

Two thousand pages of valuable material covering 76 major areas of plant organization, design, construction, operation, and maintenance showing how an industrial plant can be operated more efficiently, and economically. Plant maintenance, fire prevention, materials handling, patents and copyrights are a few of the subjects treated by some of the 87 contributors who have made this book one of the outstanding works on this important subject.

Chemical Formulary, Vol. IX. H. Bennett, editor-in-chief. Chemical Publishing Co. $7.

The new 9th edition is a collection of valuable, timely and practical commercial formulae and recipes for making thousands of products in many fields of industry. The Editor is to be congratulated on the style and preparation of this book. It is concise, and yet thorough. Problems can be solved quickly. The alphabetical list of chemicals and trade mark products with the names of their manufacturers serves as a guide in buying the chemicals for formulations.

Engineering Hydraulics, by Hunter Rouse, Prof., Fluid Mechanics, Director, Iowa Inst. of Hydraulic Research, State Univ. of Iowa. John Wiley & Sons. $15.

Proceedings of the fourth hydraulics conference of the Institute prepared by thirteen selected authorities. It is the first American reference book to present this applied science in a comprehensive manner. Like a monograph, each chapter is a self-contained and authoritative treatment of a particular subject.

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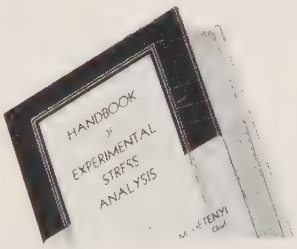

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Small Plant Management. Edited by Dr E. H. Hempel, prepared under th auspices of the Management Div., A.S M.E. $4.80 to Members, A.S.M.E. $6.00 to non-members. McGraw-Hil Book Co.

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Chemical Thermodynamics, Irving M Klotz, Prof., Chemistry, Northweste University. Prentice-Hall, Inc. $6.

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Circuit Analysis of A-C Power Systems, Vol. 2. Edith Clarke, Prof., Electrical Engrg., Univ. of Texas. John Wiley & Sons. $8.50.

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Kinematics of Machines, George L. Guillet and A. H. Church. 5th edition. John Wiley & Sons. $4.

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Similitude in Engineering, Gleen Murphy, C.E., Ph.D., Prof., Theoretical and Applied Mechanics, Iowa State College. Ronald Press. $7.

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The Engineering Method, John Charles Lounsbury Fish. Stanford University Press. $3.

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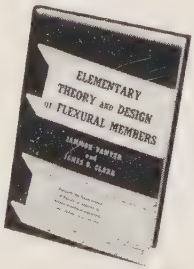

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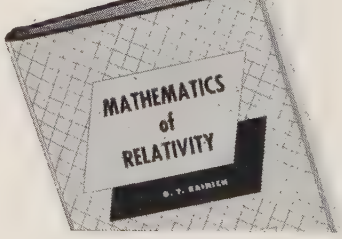

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Response of Physical Systems, John Dezendorf Trimmer, Prof., Physics, Univ. of Tenn. John Wiley & Sons. $5.

The author has directed his book both to students and to workers in engineering and applied physics, who have an immediate interest in learning the theory applicable to physical systems, and to those who have a different or broader interest in system response, and are able, therefore, to profitably survey the successful application of mathematics to physical systems. An effort has been made to adopt symbols and terms already in use by established workers in his particular field. A good book on the subject it treats.

The Work of Oscar Niemeyer, edited by Stamo Papadaki. Reinhold Publishing Co. $9.

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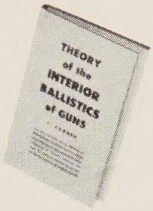

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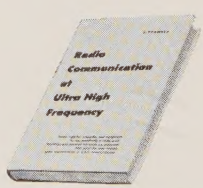

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